C/ Chaparral

RECORD OF COMMUNICATION	Phone Call	Conference	Date: 05/06/10
	Discussion	Other FAX	Time:
TO: The file		FROM: Ray Leissner, EPA Region 6 Phone: 214-665-7183	

RE: Meeting with Chaparral Energy LLC on approach to N Burbank CO2 water flood pilot project

Attending:

David Spencer, Regulatory manager, Chapparral
Mike Pickett, Operations Superintendent

Phil Dellinger, EPA
Ray Leissner
Ken Johnson
Ron Vanwyk
Ken Williams

Discussions centered on the approach. It was agreed Chaparral would apply for an area permit. AOR concerns were discussed from findings of an earlier submission for a single well. Several wells in the AOR had been mud plugged in the early 6o's with much of the casing pulled. No cement data was available for the outside of the casing remaining in the hole. D. Spencer informed that it was not likely there was cement behind pipe in those cases. Wellbore closure was apparently so effective that some pipe had to be left in the well upon salvage operations.

Phil Dellinger offered that in previous applications wherein mud plugged wells were targeted for corrective action, it was determined by EPA and Chaparral that the mud that Philips had used years earlier had created a very robust seal, sufficient for purposes of their intended water flood. It was determined that reentering such wells on a preemptive basis was unnecessary.
The Chaparral reps provided historic information to counter concerns over unknown or improperly abandoned wellbores, including small number of historic operators, field practices, redrilling of wells, isolation efforts prior to waterflooding, interviews with old-timers in the area, etc. EPA mentioned this "cornucopia" approach to address uncertainty would probably be requested as part of the permit application process.

Ray Leissner provided wellbore diagrams of the artificial penetrations from the initial first well application reflecting the general approach to reconstructing both producers and injectors in the field. In general that approach consisted of cementing the bottom 300' and top 500'of the long string and production string casing and setting and cementing a liner in the production casing from surface to near bottom of the long string. Chaparral agreed to include well bore diagrams for all AOR APs in the future.

K. Williams suggested that private domestic drinking water wells in the project area be tested prior to injection of CO2. This baseline water quality data would be used to document water quality before, during and after the recovery project. In areas that lack adequate private drinking water wells to monitor; some monitoring wells may need to be drilled to provide suitable coverage. It was suggested that tracking water quality during the course of the project would be a valuable tool for measuring the success of the injection process and for countering any water quality concerns that may be reported in the future. EPA and Chaparral will agree to a list of analytes to be monitored and the monitoring frequency.

Ken Williams and Ken Johnson both discussed the need for baseline ground water information prior to initiating CO2 injection on USDW characteristics and suggested that sampling could performed on area water supply wells. Ken Johnson offered several factors requested for review in the application in addition to the reservoir parameters and well logs. Ken's list included:

- Information on area USDW geology including log data, cross sections, and determination of the lowermost USDW depths throughout the field
- Injection interval reservoir fluid information such as oil gravity and brine salinity along with bottomhole temperature
- Injection reservoir characteristics such permeability to oil, water, and CO2 along with porosity
- Injection reservoir static pressure data and how, where, when the data were obtained
- Step rate tests to determine fracture pressure
- Reservoir geology information including maps and cross sections to show continuity of vertical barriers to CO2 movement, faulting, and injection interval layers/lenses
- Composite base map showing all possible documented artificial penetration locations and a list of base map sources/versions
- Location and depths of area water wells within proposed CO2 flood areas
- Sampling data from area water wells including information such as chlorides, alkalinity, and pH
- Once the project is underway, voidage and pressure monitoring by reporting of injected CO2 and water volumes, injection pressures, and produced fluid volumes from individual wells within the CO2 flood areas
- Possible limited use of shallow ground water monitoring wells in areas of project with limited or no well records to document artificial penetration conditions
- Written documentation of historical drilling, completion, casing removal, and plugging and abandonment practices for area wells including company records, SPE and AAPG articles, and state reports to support abandoned well conditions assumed

Of note, a key concession was agreed to in the meeting. Provided that the monitoring wells were not unreasonably numerous, Chaparral agreed to a GW monitoring system strategically placed to reveal encroachment on the base of the USDW. A scheme to locate the number and position of these wells is not yet devised. Mike Pickett suggested they might incorporate the use of local water wells. EPA accepted this as a good idea but made clear it will not supplant the monitoring envisioned for the base of the USDW.

For the next step, EPA is expecting Chaparral to provide the bulk of requested materials

necessary to evaluate the project for an area permit.